

KING-GAGE® Marine Systems

Tank Level and Draft Indicating Systems for the Marine and Offshore Industries

LP2™ SP

Tank Level Monitor/Setpoint Controller

- Displays Tank Volume and/or Depth
- Digital Setpoint SPDT Relays
- 8 Tank Input Channels
- Dual Communications Ports

The new LP2 SP Multiple Tank Indicator combines intelligent signal processing, accurate volumetric measurement and digital setpoint control. LP2 SP indicators will provide continuous measurement of liquid levels for ballast, fuel oil, potable water or other service tanks. They also provide simplified control actuation functions at user-specified setpoints.

LP2 SP multiple tank indicators accept up to eight input channels that receive proportional 4-20 mA signals from liquid level transmitters. The actual sensor used to detect hydrostatic pressure (created by liquid depth) can be either electronic or pneumatic. With the latter, an electronic pressure transmitter is used to convert the sensor's pneumatic signal into 4-20 mA output (using a KING-GAGE® D/P Transmitter).

LP2 SP indicators express tank level directly in engineering units. The indicator references a capacity profile to correlate transmitter output to actual tank geometry. The indicator then formats the resulting value directly as the total weight or volume of liquid in the tank. LP2 SP display panels and keypad provide access to control setpoints and function selections. Simply enter setpoint values directly in percent full, depth or volume amounts. All application details are factory programmed into an innovative nonvolatile modular memory called the *Datapack iButton*.



LP2™ SP Multiple Tank Indicator
& Digital Setpoint Controller

Applications Include:

- Ship's Draft
- Ballast Water Tanks
- Fuel Oil Tanks
- Day Tanks
- Bunker Oil Tanks
- Drill Water Tanks
- Lube Oil Sump Tanks
- Inner Bottom Tanks
- Liquid Cargo Tanks

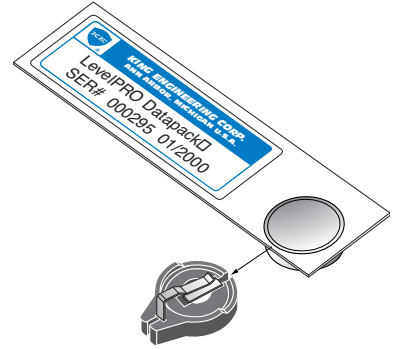


Surface Mount Enclosure

Rugged corrosion proof housing for bulkhead mounting (requires 100-240 Vac electrical connection).

Application Programming

The LP2 indicator references a capacity profile to correlate transmitter output to actual tank geometry. This profile plus additional application details are factory programmed into an innovative nonvolatile Datapack iButton memory module. Different units of measurement and/or specific gravity values can be assigned to each tank in the system. LP2 stores all the user selections in its Datapack iButton memory. The more critical data is restricted to read only access to prevent any possible corruption of the original factory programming.



Typical Ballast Tank Indicating System

788 Purge Control supplies air to downpipe in tank. Pressure created due to liquid depth generates a proportional 4-20 mA output signal from the transmitter. The LP2 indicator calculates the actual tank level (or volume amount).

4-20 mA Signal

788 Purge Controls

Wing Tank

Downpipe

Double Bottom Tank

738 D/P LiquiSeal Control

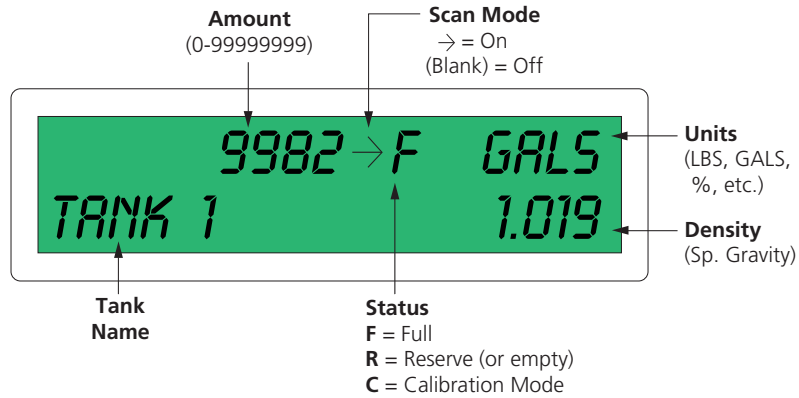
Draft Tube

Typical Draft Indicating System

738 D/P LiquiSeal Sensor provides air purge to draft tube. Pressure created within tube is sensed by sensor which outputs a proportional 4-20 mA signal. Corresponding draft level is shown on the LP2 display.

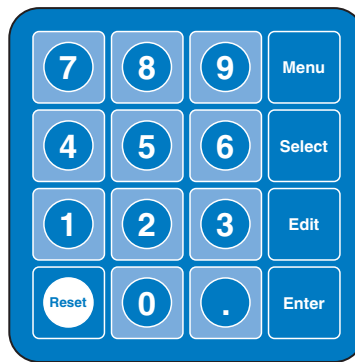
4-20 mA Signal

LP2 Tank Level and Draft Indicating Systems



LP2 SP Operator Interface

You can view tank input channels either by scanning or random access. Press the desired channel number directly to view tank level. To continue viewing tank channels in sequential order, simply press SELECT to view the next channel. Holding the key down for 3-seconds initiates the auto scan mode for all tank channels. Press any key to restore normal single channel display mode.



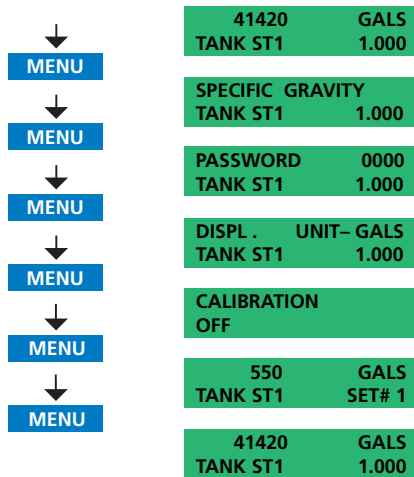
and following the menu selections until SET# 1 or SET# 2 appears. Press the EDIT key and directly enter the level value for the setpoint. This value is stored in nonvolatile memory and will be automatically compensated for any later changes in specific gravity.

The user interface of the LP2 is extremely easy to operate. Simply press the MENU key to cycle through options such as Display Unit selection, Specific Gravity input, Calibration mode, Setpoints input and Password Access (to restrict specific gravity entry). Entering setpoints is as simple as choosing the tank channel

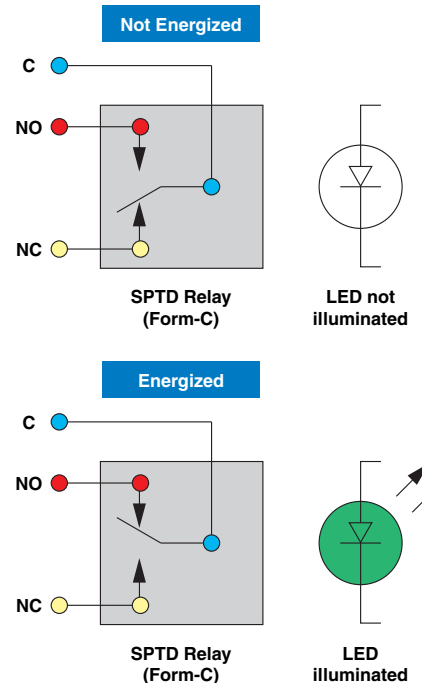
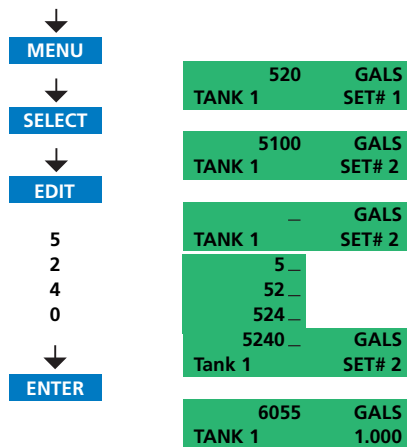
The LP2 SP provides the user with two (2) fully independent SPDT relays per tank input channel. The configuration includes normally-open (NO), normally-closed (NC) and common (C) relay contacts.

Factory programming options include standard LOW-HIGH (descending/ascending) or HIGH-HIGH (ascending/ascending) setpoint actuation.

Menu Display Modes



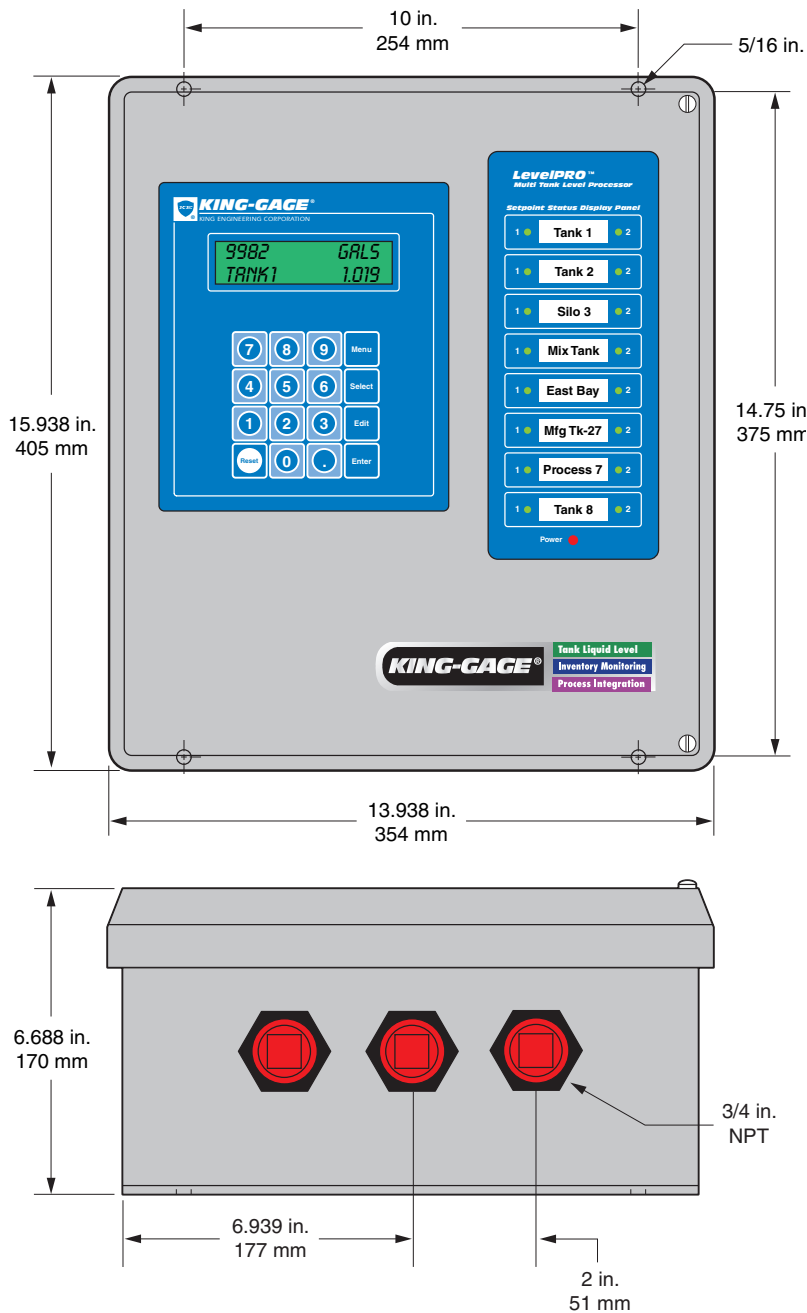
Tank Setpoint Editing



Low/High (-1) or High/High (-2) Actuation

Factory programming for setpoint actuation is Low-High (descending/ascending) or High-High (ascending/ascending). Low (descending) actuation occurs as the measured value drops below a predetermined setpoint. High (ascending) actuation is the result of the measured value exceeding a predetermined setpoint.

KING-GAGE® Marine Systems



Model 4641-2-0

Specifications

Power Requirements

100-240 Vac, 50-60 Hz, 25 watts (fused for 2.5 A 120/250 V)

Temperature Range (Environmental)

30°F to 120°F (-1°C to 49°C) operating range

Signal Input

4-20 milliamperes (mA_{dc})

Input Channels

8 input channels; two wire 4-20 mA analog signal

Keypad

Membrane numeric keypad, five (5) function keys, positive tactile response

Power Output

24 Vdc nominal; fused @ 0.5 Amp

Input Impedance (Resistance)

120 ohm nominal (2.4 Vdc drop @ 20 mA_{dc})

Memory

Nonvolatile 64kbit memory iButton

Digital Readout

Alphanumeric 0.3173 in. (8 mm) 16-character x 2-line LCD; numeric 8-digit (0-99999999 maximum)

Accuracy

±0.048% FS (±0.024% FS, typical)

Resolution

±0.024% FS maximum (±0.004 mA)

Communications

Two (2) serial EIA RS-485 ports; two wire multidrop

Setpoint Relays

Sixteen (16) independent user setpoints; two (2) setpoints per tank channel; SPDT (form-C) relays, maximum 3.0 A @ 115 Vac. Rated for minimum 100,000 cycle/life at rated load; continuously adjustable over full input range.

Status Display Panel

LED setpoint indicators for visual confirmation when individual SPDT relays are energized.

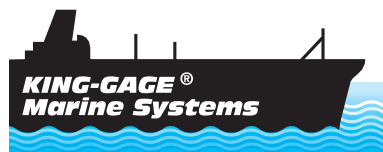
Housing

Fiberglass-reinforced polyester (FRP) enclosure; U.L. listed (U.L. 508) types 3, 3R, 3S, 4, 4X, and 12.

Not Shown: Optional stainless steel (type 304) enclosure; overall maximum dimensions 15-1/2" H x 13" W x 6" D.



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